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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte DAVID J. KUBISTA,
TRUNG T. DOAN, LYLE D. BREINER,
RONALD A. WEIMER, KEVIN L. BEAMAN,
ER-XUAN PING, LINGYI A. ZHENG
and CEM BASCERI

Appeal 2009-003245
Application 10/687,458
Technology Center 1700

Decided: September 2, 2009

Before BRADLEY R. GARRIS, CHUNG K. PAK, and
TERRY J. OWENS, *Administrative Patent Judges.*

PAK, *Administrative Patent Judge.*

DECISION ON APPEAL

Appellants appeal under 35 U.S.C. § 134(a) from the Examiner's decision finally rejecting claims 16 through 23 (Final Office Action, mailed May 8, 2006), the only claims pending in the application. We have jurisdiction under 35 U.S.C. § 6(b).

We REVERSE.

STATEMENT OF THE CASE

The subject matter on appeal is directed to "systems for depositing material onto workpieces in reaction chambers" (Spec. 5, para. 0017). The systems are said to be useful for increasing the throughput via reducing or eliminating the downtime required to service traps used for collecting byproducts in exhaust lines and for maintaining the pressure differential within the desired range in the exhaust lines (Spec. 6, paras. 0017-0018 and Spec. 11, para. 0028). Details of the appealed subject matter are recited in representative claims 16 and 20 reproduced from the Claims Appendix to the Appeal Brief ("App. Br."), filed January 16, 2007:

> 16. A system for depositing material onto a workpiece in a reaction chamber, the system comprising:
>
> a reaction chamber;
>
> a mainline coupled to the reaction chamber, the mainline having a first branchline and a second branchline each downstream from the reaction chamber;
>
> a first trap in the first branchline to collect byproducts from the reaction chamber;
>
> a second trap in the second branchline to collect byproducts from the reaction chamber;
>
> a throttling valve in the second branchline;
>
> a pressure monitor to determine a pressure difference between a pressure in the mainline upstream from the first trap and a pressure in the mainline downstream from the first trap;
>
> a vacuum pump coupled to the mainline; and

a controller operably coupled to the pressure monitor and the throttling valve, the controller having a computer-readable medium containing instructions that cause the controller to perform a method comprising –

exhausting byproducts from the reaction chamber through the first trap in the first branchline;

determining the pressure difference across the first trap caused by a flow of the byproducts by monitoring the pressure monitor;

dynamically controlling the flow of byproducts into the second trap in the second branchline by regulating the throttling valve; and

maintaining the pressure differential across the first trap in the mainline based on the determined pressure difference.

20. A system for depositing material onto a workpiece in a reaction chamber, the system comprising:

a reaction chamber;

a mainline coupled to the reaction chamber, the mainline having a first branchline and a second branchline each downstream from the reaction chamber;

a first trap in the first branchline to collect byproducts from the reaction chamber;

a second trap in the second branchline to collect byproducts from the reaction chamber;

a throttling valve in the second branchline;

a pressure monitor to determine a pressure difference between

a pressure in the mainline upstream from the first trap and a pressure in the mainline downstream from the first trap;

a vacuum pump coupled to the mainline; and

a controller operably coupled to the pressure monitor and the throttling valve, the controller having a computer-readable medium containing instructions that cause the controller to perform a method comprising –

exhausting byproducts from the reaction chamber through the first branchline;

collecting byproducts in the first trap in the first branchline;

monitoring the difference between the pressure in the mainline upstream of the first trap and the pressure in the mainline downstream of the first trap;

regulating the throttling valve in the second branchline in response to the monitored pressure differential in the mainline to flow byproducts into the second branchline; and

maintaining the pressure differential in the mainline within a desired range by regulating the throttling valve.

The Examiner relies on the following evidence to establish unpatentability of the claims on appeal (Examiner's Answers ("Ans."), mailed September 26, 2007 and January 16, 2008, 2):

Aral	6,022,483	Feb. 8, 2000
Schmitt	6,402,806 B1	Jun. 11, 2002

Appellants request review of the Examiner's rejection of claims 16 through 23 under 35 U.S.C. § 103(a) as unpatentable over the combined disclosures of Schmitt and Aral (App. Br. 6).

In rejecting the claims on appeal under 35 U.S.C. § 103, the Examiner relies on Schmitt for teaching a semiconductor processing system comprising a chemical vapor deposition (CVD) reaction chamber for depositing a material on the surface of a wafer (a workpiece), a mainline having first and second branch lines coupled to the reaction chamber, first and second traps in the first and second branch lines respectively to collect byproducts from the reaction chamber, a vacuum pump coupled to the mainline and a pressure monitor for determining a pressure difference between a pressure in the mainline upstream from the first trap and a pressure in the mainline downstream from the first trap (Ans. 3-5). The Examiner admits that Schmitt does not teach employing a throttling valve in its second branch line and a controller specifically programmed for particular functions coupled to the throttling valve and its pressure monitor (Ans. 6).

To remedy the above deficiencies of Schmitt, the Examiner relies on Aral to show (Ans. 8) that:

> [A] wafer processing apparatus (Figure 1; column 3, line 34-column 3, line 35) including exhaust control apparatus (Figure 4; column 6, line 13-column 10, line 40) comprising a controller (Figure 4) for controlling a throttle valve (118; Figure 1) [and] for controlling processing chamber pressure (column 2; lines 40-58) based on pressure differences (Equation 3).

The Examiner then concludes (*id.*) that:

> It would have been obvious to one of ordinary skill in the art at the time the invention was made to add Aral's exhaust control apparatus to Schmitt's system.
>
> Motivation to add Aral's exhaust control apparatus to Schmitt's system is for controlling to Schmitt's reactor pressure as taught by Aral (column 1, lines 9-26). Further, it is well established that the duplication of parts is obvious (In re Harza, 274 F.2d 669, 124 USPQ 378 (CCPA 1960) MPEP 2144.04).[1]

Appellants traverse the Examiner's § 103 rejection. Appellants contend that the combination of Schmitt and Aral as suggested by the Examiner would not have led one of ordinary skill in the art to the claimed system (e.g., App. Br. 9 and 11 and Reply Brief ("Reply Br."), filed November 26, 2007, 2). Appellants contend that Schmitt and Aral do not teach or would not have suggested, *inter alia*, a controller specifically programmed to carry out the functions recited in claims 16 and 20 (App. Br. 10-12).

ISSUE AND CONCLUSION

Have Appellants identified reversible error in the Examiner's determination that the collective teachings of Schmitt and Aral would have led one of ordinary skill in the art to the claimed subject matter within the meaning of 35 U.S.C. § 103(a)?

On this record, we answer this question in the affirmative.

[1] It is not clear to us what parts are duplicated and obvious. The only thing that seems to be duplicative is the repetitive and convoluted findings in the Answer.

FINDINGS OF FACT ("FF")

1. The Examiner finds, and Appellants do not dispute, that Schmitt teaches a semiconductor processing system comprising a CVD reaction chamber, a mainline having first and second branch lines coupled to the reaction chamber, first and second traps in the first and second branch lines, a vacuum pump coupled to the mainline and a pressure monitor for determining a pressure difference between a pressure in the mainline upstream from the first trap and a pressure in the mainline downstream from the first trap. (Compare Ans. 3-5, with App. Br. 6-12 and Reply Br. 1-3; see also Schmitt, Fig. 5).

2. The Examiner acknowledges that Schmitt does not teach employing a throttling valve in its second branch line and a controller specifically programmed for the particular functions recited in claims 16 and 20 coupled to the throttling valve and its pressure monitor (Ans. 6-8).

3. Aral teaches a system for controlling the pressure in a processing chamber with an automatic pressure control system, such as a computer controlled exhaust throttle valve (col. 1, ll. 4-27 and col. 2, ll. 40-60).

4. Aral teaches a wafer processing system comprising a vacuum processing chamber having gas inlets and gas outlets, a vacuum pump for drawing gas from the gas outlets of the vacuum processing chamber, a pressure sensor for monitoring the pressure in the vacuum processing chamber, a throttle valve coupled to the vacuum pump for controlling the

pressure in the vacuum processing chamber and a valve controller for adjusting the throttle valve (col. 1, ll. 4-27 and col. 3, ll. 34-48).

5. Aral teaches (col. 3, ll. 49-57) that:

> In operation, gases are supplied to chamber 112 through the gas inlet metering devices, vacuum pump 120 is activated, and throttle valve 118 is adjusted to achieve a desired pressure level in chamber 112. If the chamber pressure level is low, throttle valve 118 is further closed to reduce the rate that vacuum pump 120 removes gas from chamber 112. If the chamber pressure level is high, throttle valve 118 is further opened to let more gas escape from chamber 112, thereby reducing the pressure inside chamber 112.

6. Aral teaches that its "invention provides a high performance system for controlling pressure in a chamber by effectively linearizing the control component of the non-linear system" (col. 3, l. 67 to col. 4, l. 3).

7. Aral teaches the importance of maintaining the pressure of an etching chamber (vacuum wafer processing chamber) at a constant level during the etching process to avoid defective etching (col. 1, ll. 9-26).

PRINCIPLES OF LAW

"[A] patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art." *KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. 398, 418-19 (2007). The Examiner needs to identify a reason that would have prompted one of ordinary skill in the art to combine the elements to arrive at the claimed subject matter. *Id.* "[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal

conclusion of obviousness." *KSR* at 417-18, *quoting In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006).

The Examiner has the initial burden of establishing a prima facie case obviousness under 35 U.S.C. § 103. *In re Oetiker*, 977 F.2d 1443, 1445 (Fed. Cir. 1992) ("[T]he examiner bears the initial burden, on review of the prior art or on any other ground, of presenting a *prima facie* case of unpatentability.").

ANALYSIS

As correctly pointed out by Appellants at pages 9 through 12 of the Appeal Brief, the combination of Schmitt and Aral suggested by the Examiner would not result in the claimed system. To impart the advantage taught by Aral to Schmitt's system as suggested by the Examiner, one of ordinary skill in the art would have been led to employ a throttle valve and its controller coupled to a pressure sensor for monitoring the pressure of Schmitt's processing chamber. Aral teaches employing a throttle valve, together with a pressure sensor for monitoring the pressure of a processing chamber and a vacuum pump for drawing gas from the processing chamber, to advantageously maintain the pressure of the processing chamber at a constant level. Aral does not teach operating a throttle valve in response to a pressure difference between pressures in the upstream and downstream of a first trap to control the pressure of the processing chamber. It follows that the Examiner has not demonstrated that one of ordinary skill in the art would have been led to employ at least a controller specifically programmed to perform the functions recited in claims 16 and 20.

Accordingly, we concur with Appellants that the Examiner has not established a prima facie case of obviousness within the meaning of 35 U.S.C. § 103(a).

CONCLUSION

Appellants have identified reversible error in the Examiner's obviousness determination. The decision of the Examiner rejecting the claims on appeal is reversed.

REVERSED

psb

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